

B21B

ROLLING OF METAL

Definition statement

This subclass/group covers:

Methods and devices for rolling of metal.

Rolling is a metal forming process in which metal is passed through a pair of rotating rolls for plastic deformation of the metal. Rolling is classified according to the temperature of the metal rolled. If the temperature of the metal is above its recrystallization temperature, then the process is termed as hot rolling. If the temperature of the metal is below its recrystallization temperature, the process is termed as cold rolling.

A rolling mill is a machine for plastic deformation of metal between rotating rolls. In a broader sense, a rolling mill is an automatic system or line of machines that performs both rolling and auxiliary operations: transport of the original billet from the stock to the heating furnaces and the mill rolls, transfer of the rolled material from one groove to another, turning, transport of the metal after rolling, cutting into sections, marking or stamping, trimming, packing, and conveyance to the stock of finished product.

This subclass includes the following main groups:

Rolling of metal in general:

- Methods or devices in general

[B21B 1/00](#), [B21B 11/00](#) to [B21B 13/00](#)

- Control

[B21B 37/00](#)

- Measuring

[B21B 38/00](#)

- Operation

[B21B 35/00](#), [B21B 39/00](#), [B21B 41/00](#)

- Details of rolling mills

[B21B 27/00](#), [B21B 29/00](#), [B21B 31/00](#)

- Maintenance of rolling rolls

[B21B 28/00](#)

- Safety devices

[B21B 33/00](#)

- Cooling beds and accessories

[B21B 43/00](#)

Rolling of special formats:

- tube rolling

[B21B 17/00](#), [B21B 19/00](#), [B21B 23/00](#)

- accessories for tube rolling

[B21B 25/00](#)

- Extending closed shapes of metal bands

[B21B 5/00](#)

Rolling of special alloys:

[B21B 3/00](#)

Rolling of metal under special conditions (e.g. in vacuum or inert atmosphere):

[B21B 9/00](#)

Auxiliary measures for metal rolling:

[B21B 15/00](#), [B21B 45/00](#), [B21B 47/00](#)

References relevant to classification in this subclass

This subclass/group does not cover:

Descaling of rod or wire	B21C 43/04
Separating tubes from mandrel	B21C 45/00
Technical details of coiling/ uncoiling devices	B21C 47/00
Technical details of devices for temporarily accumulating material	B21C 49/00
Manufacture of particular objects by rolling, e.g. screws, wheels, rings, barrels, balls	B21H

Informative references

Attention is drawn to the following places, which may be of interest for search:

Cleaning in general	B08B
Measuring, gauging, indicating, counting, or marking devices adapted for use in the production or manipulation of material in accordance with subclasses B21B to B21F	B21C 51/00
Working of metal otherwise than by rolling, punching	B21D
Casting	B22D
Welding	B23K
Relatively slidable coverings	B23Q 11/0825
Flexible coverings	B23Q 11/085
Conveying or transporting in general	B65G
Altering the metallurgical properties of metal by heat treatment or by hot or cold working	C21D , C22F
Composition of alloys	C22C
Calendar rolls for paper- making machines	D21G
Fixed or movable closings	E06B
Bearings in general	F16C
Couplings, clutches, brakes	F16D
Sealings	F16J
Frames, casings, stands, supports in general	F16M

Safety devices in general	F16P
Heat recovering devices	F22B
Furnaces	F27B
Measuring instruments	G01B , G01H

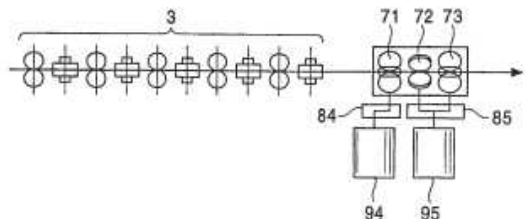
B21B 1/00

Metal-rolling methods or mills for making semi-finished products of solid or profiled cross-section (B21B17/00 to B21B23/00 take precedence; with respect to composition of material to be rolled B21B3/00; extending closed shapes of metal bands by simultaneous rolling at two or more zones B21B5/00; metal-rolling stands as units B21B13/00; continuous casting into moulds having walls formed by moving rolls B22D11/06); Sequence of operations in milling trains; Layout of rolling-mill plant, e.g. grouping of stands; Succession of passes or of sectional pass alternations

Definition statement

This subclass/group covers:

This main group covers:

Continuous rolling processes	 <p>Mill train designed to have the workpiece enter one pair of rolls before leaving the preceding pair.</p>
Semi- continuous rolling process	

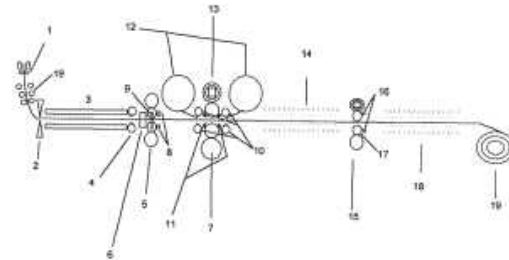
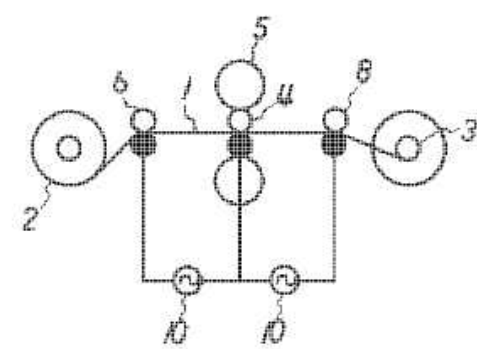
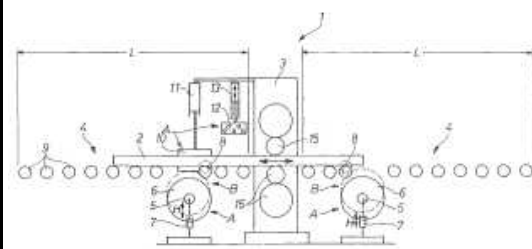


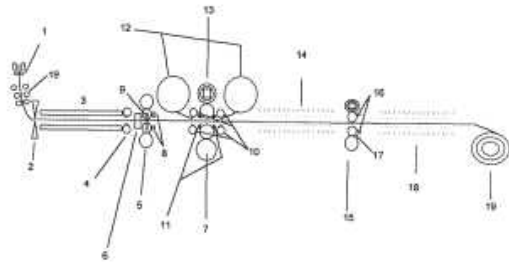
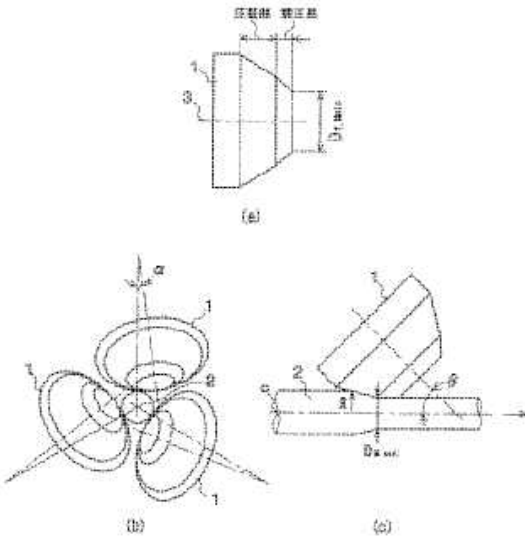
Figure 2

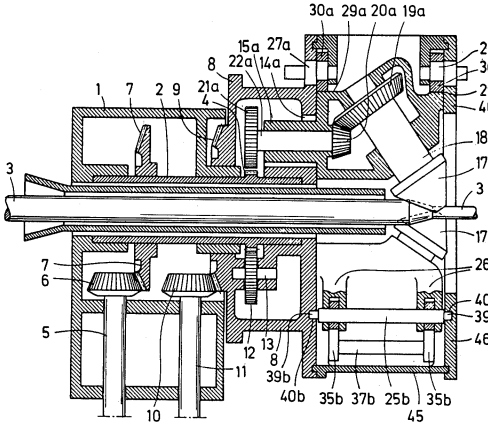
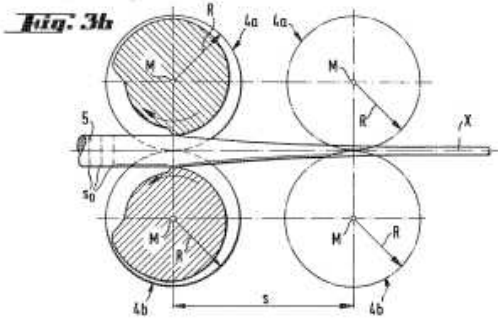
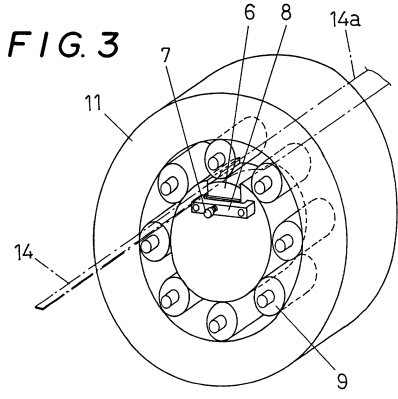
A continuous arrangement for high-production rolling of almost all products requires the construction of long rolling trains and buildings, but layouts can be shortened by a so-called semi-continuous mill, in which the workpiece is passed back and forth through a reversing mill (see below) before being sent through the rest of the line.

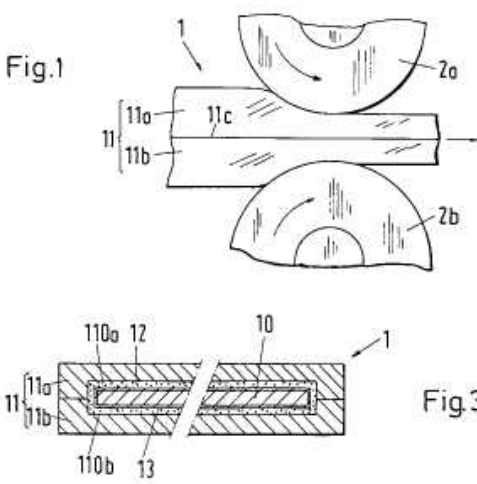
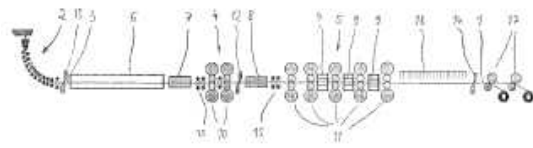
Reverse rolling



For difference to Steckel mill rolling, see below.

Steckel mill rolling	 <p>Figure 2</p> <p>A Steckel mill is similar to a reversing rolling mill except that two coilers are used to feed the material through the mill. One coiler is on the entrance side and the other on the exit side. The coilers pull the material through the mill, therefore the process is more similar to drawing rolling. The material is fed back and forth through the mill until the desired thickness is reached, much like a reversing rolling mill</p>
Skew rolling of wire or like small cross section"	 <p>(a)</p> <p>(b)</p> <p>(c)</p>
Planetary cross rolling of wire or like small cross section"	

	
<p>Step-by-step rolling</p>	
<p>Planetary rolling</p>	
<p>"Rolling clad products"</p>	

	 <p>Fig. 1</p> <p>Fig. 3</p>
Rolling metal immediately subsequent to continuous casting	 <p>(WO2007073841 A)</p>

References relevant to classification in this main group

This subclass/group does not cover:

Rolling of materials of special alloys so far as the composition of the alloy requires special rolling methods or sequences	B21B 3/00
Extending closed shapes of metal bands by simultaneous rolling at two or more zones	B21B 5/00
Metal- rolling stands as units	B21B 13/00
Rolling methods or rolling mills for making or processing tube	B21B 17/00 to B21B 23/00
Continuous casting into moulds having walls formed by moving rolls	B22D 11/06

B21B 3/00

Rolling materials of special alloys so far as the composition of the alloy requires or permits special rolling methods or sequences [N: Rolling of aluminum, copper, zinc or other non-ferrous metals] (altering special metallurgical properties of alloys, other than structure consolidation or mechanical properties resulting there from C21D, C22F)

Definition statement

This subclass/group covers:

This main group covers: Rolling of stainless steel and of powder metal alloys and other metal alloys that require apparatus manipulation or special methods not required for regular hot or cold rolling.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Altering the metallurgical properties of metal by heat treatment or by hot or cold working	C21D , C22F
Making of alloys/ composition of alloys	C22C

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

In this main group, the following terms (or expressions) are used with the meaning indicated:

B21B 5/00

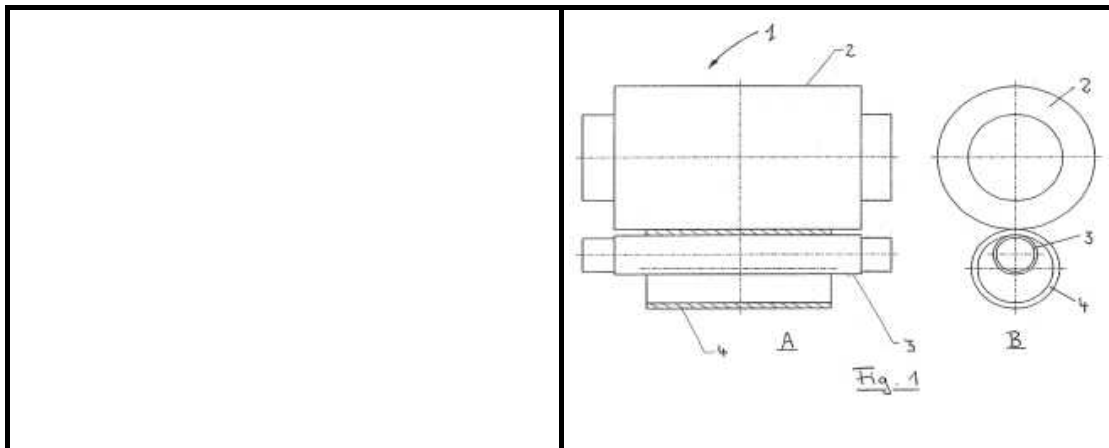
**Extending closed shapes of metal bands by rolling
(manufacture of circular shapes, e.g. wheel rims, B21H1/06)**

Definition statement

This subclass/group covers:

This main group covers:

Extending closed shapes of metal bands by rolling the closed shapes between at least two rolls	
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Manufacture of circular shapes, e.g. wheel rims	B21H 1/06
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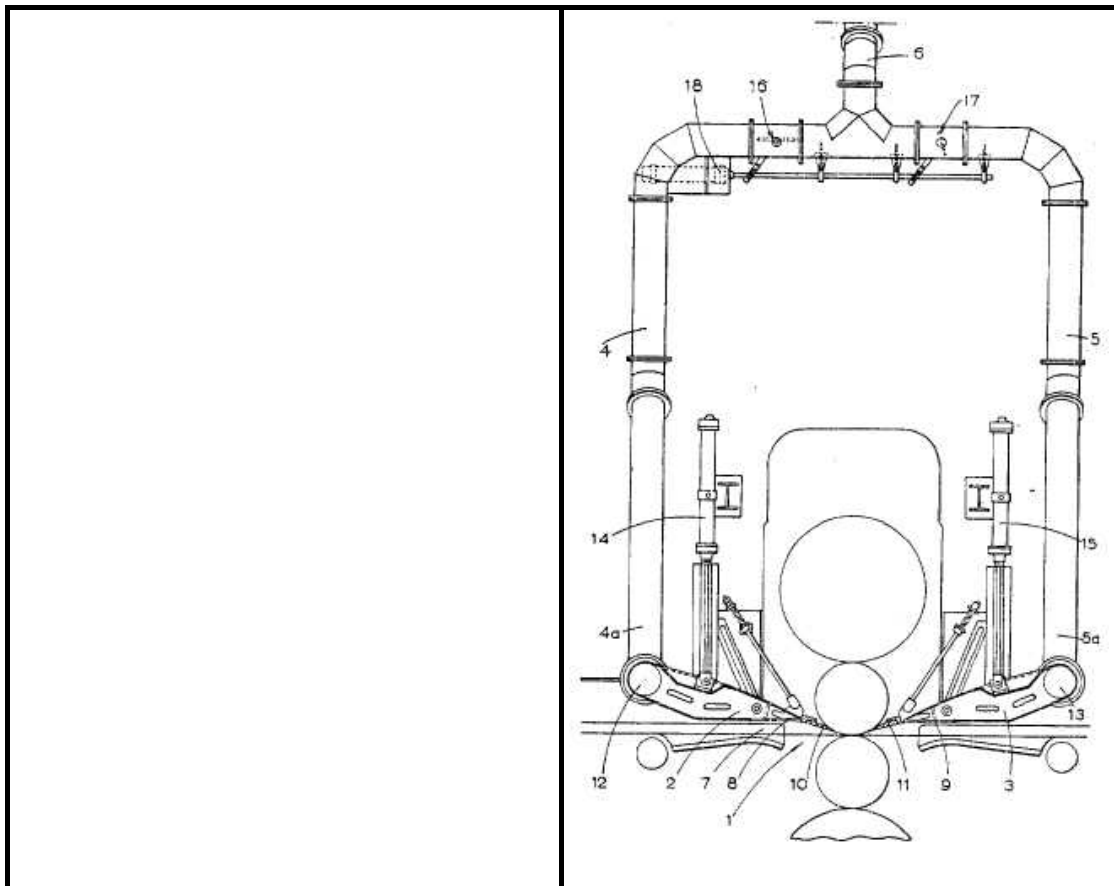
B21B 9/00

Measures for carrying out rolling operations under special conditions, e.g. in vacuum or inert atmosphere to prevent oxidation of work; Special measures for removing fumes from rolling mills

Definition statement

This subclass/group covers:

Rolling in vacuum or in inert atmosphere	<p>5, 5': Introduction of inert gas(JP 6453706 A)</p>
Removing fumes from rolling mills	



Informative references

Attention is drawn to the following places, which may be of interest for search:

Frames, casings, stands, supports in general	F16M
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B21B 11/00

Subsidising the rolling process by subjecting rollers or work to vibrations, [N: e.g. ultrasonic vibrations]

Definition statement

This subclass/group covers:

This main group covers: Methods and devices for creating vibrations in the work or in the rolling rollers.

Informative references

Attention is drawn to the following places, which may be of interest for search:

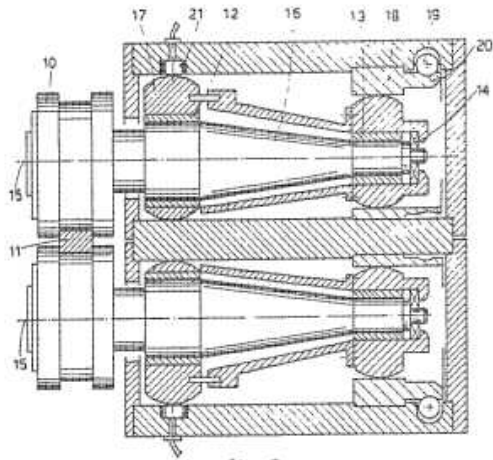
Methods or apparatus for generating mechanical vibrations of infrasonic, sonic, or ultrasonic frequency	B06B 1/00
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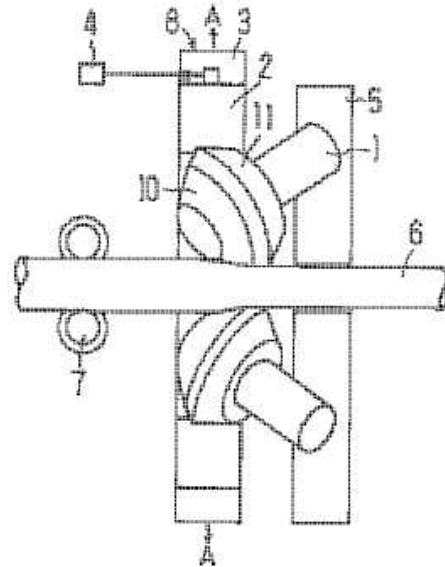
B21B 13/00

Metal-rolling stands, i.e. an assembly composed of a stand frame, rolls, and accessories (B21B17/00 to B21B23/00 take precedence; details, component parts, accessories, auxiliary means, procedures in connection with metal rolling, see the relevant groups)

Definition statement

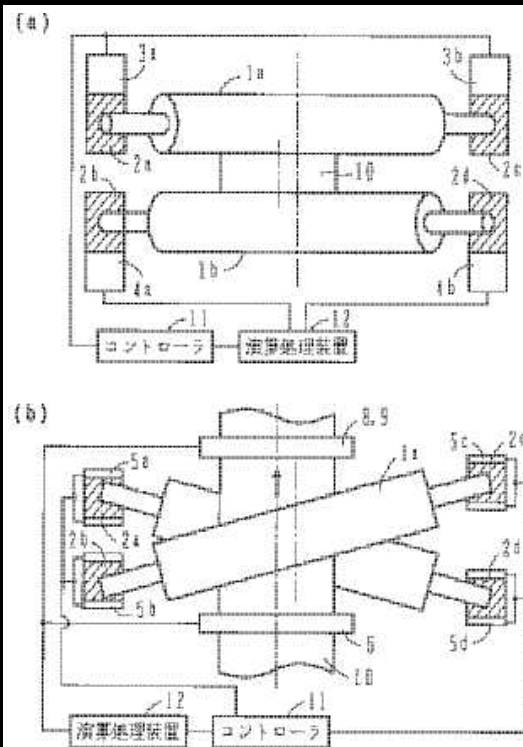
This subclass/group covers:

"Cantelever(ed) roll stands"	 <p>fig.3</p>
"Skew rolling stands"	

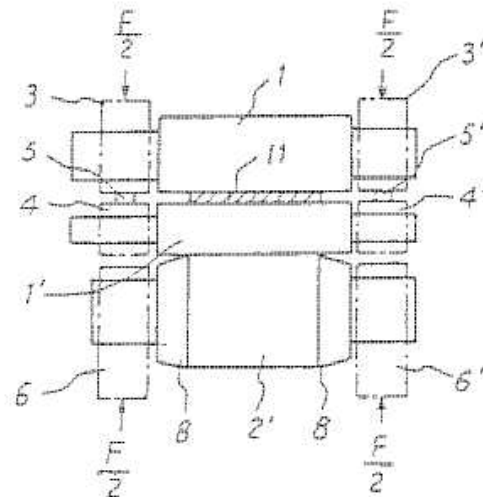


In principle for rolling of round material.

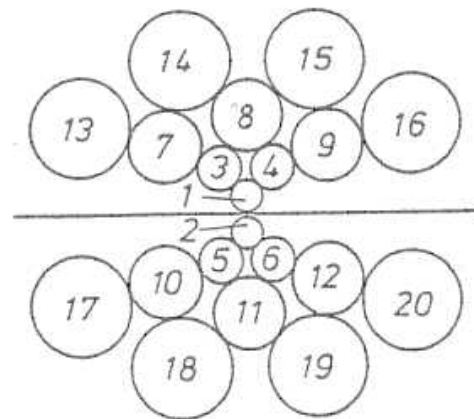
"Cross rolling stands"



" Three- high arrangement"



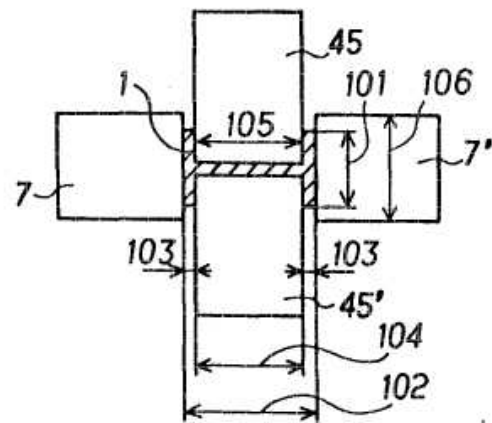
"Sendzimir mills" / "cluster mills"



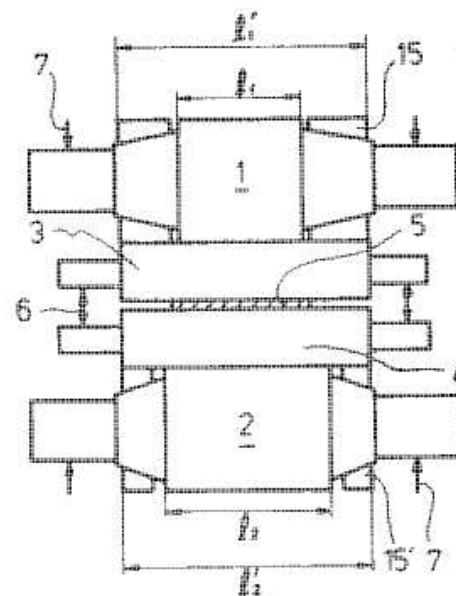
COPY

A mill having small-diameter working rolls, each backed by a pair of supporting rolls, and each pair of these supported by a cluster of three rolls; used for cold-rolling wide sheets of metal to close tolerance. The mill accommodates rolls within an integral housing, and conducts the rolling reduction adjustment of the work rolls by means of eccentrically mounted

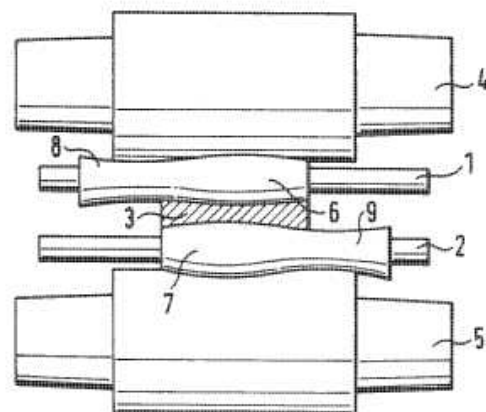
	<p>back-up bearings, wherein rotation of the eccentric mountings will move the back-up bearings toward and away from the roll gap for correspondingly changing the gap.</p>
"Rohn mills"	<p>Cluster mill (see before) with a housing for accommodating groups of rolls is split into upper and lower parts. The split housings are supported by four stanchions or two stanchions and hinges. The rolling reduction adjustment of the rolls is carried out in such a way that the upper split housing is pressed down by rotatable screws of the respective stanchions, by means of an electric motor disposed on the upper split housing.</p>
"Universal mills"	



Counter pressure devices to inhibit deflection of rolls under load, e.g. back-up rolls



Axially shifting rolls (with tapered ends/ curved contour)



Informative references

Attention is drawn to the following places, which may be of interest for search:

Rolling methods	B21B 1/00
Counter pressure devices as such, e.g. (hydraulic) bending devices	B21B 29/00
Axially shifting rolls	B21B 31/18

Special rules of classification within this main group

Rolling mill stands for tube rolling including Pilger mill stands	B21B 17/00 to B21B 21/00
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Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

In this main group, the following terms (or expressions) are used with the meaning indicated:

CVC	Continuously Variable Crown
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Synonyms and Keywords

In patent documents the following abbreviations are often used:

Z- mill	Sendzimir mill
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B21B 15/00

Arrangements for performing additional metal-working operations specially combined with or arranged in, or specially adapted for use in connection with, metal-rolling mills

Definition statement

This subclass/group covers:

This main group covers in particular:

Cutting or shearing the product, forging or pressing arrangements, lubricating, cooling or heating means, joining ends of the material. Arrangements when the work is subjected to permanent internal twisting, e.g. when producing reinforcement bars or concrete. Rolling methods or rolling devices specially designed for making or processing tubes.

References relevant to classification in this main group

This subclass/group does not cover:

Lubricating, cooling or heating of the rolls	B21B 27/06
Control of tube rolling	B21B 37/78
Lubricating, cooling or heating for surface treatment of the product	B21B 45/004 , B21B 45/02

Informative references

Attention is drawn to the following places, which may be of interest for search:

Welding by means of a rolling mill	B23K 20/04
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B21B 17/00

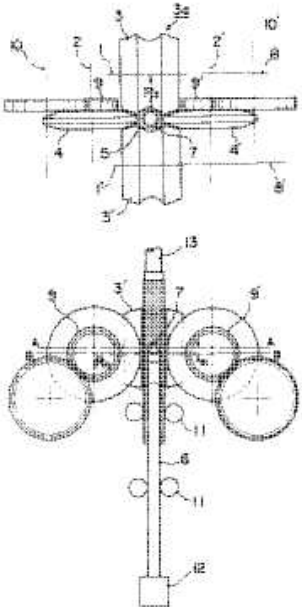
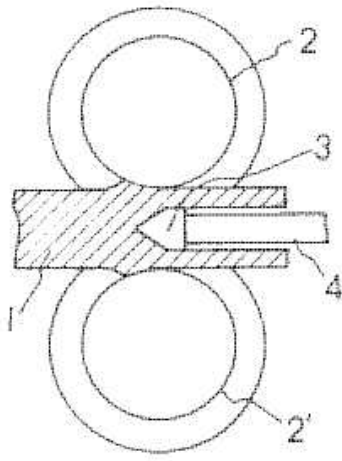
Tube-rolling by rollers of which the axes are arranged essentially perpendicular to the axis of the work, e.g. "axial" tube-rolling

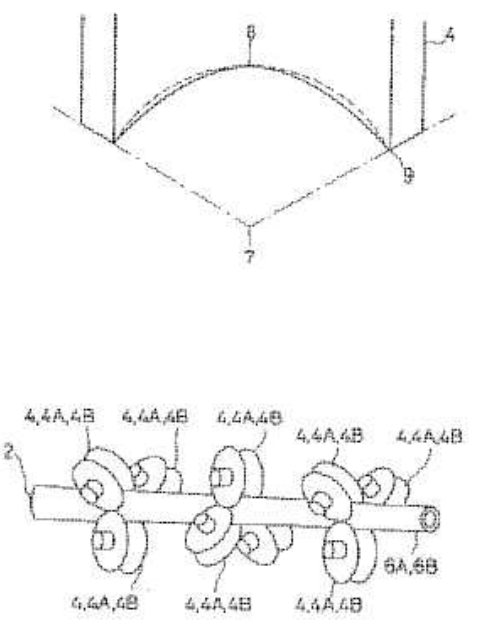
Definition statement

This subclass/group covers:

This main group covers the manufacturing of tubular products by plug rolling, stretch rolling and elongation rolling using mandrels mills, stretch reducing mills and plug rolling mills:

Press- piercing	
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<p>Plug- rolling/ mandrel plugs</p>	 <p>3 Mandrel plug.</p>
<p>Stretch- reducing</p>	

	 <p>In the reducing or stretch-reducing mill, the outside diameter of the tube is substantially reduced with the wall thickness being slightly increased.</p>
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Making tubes by pilgrim- step rolling	B21B 21/00
Combined processes for tube rolling, tube rolling not restricted to this group only	B21B 23/00
Mandrels for tube rolling, accessories therefore	B21B 25/00
Making tubes with welded/ soldered seams seams	B21C 37/08 , B21C 37/09
Control of tube rolling	B21B 37/78

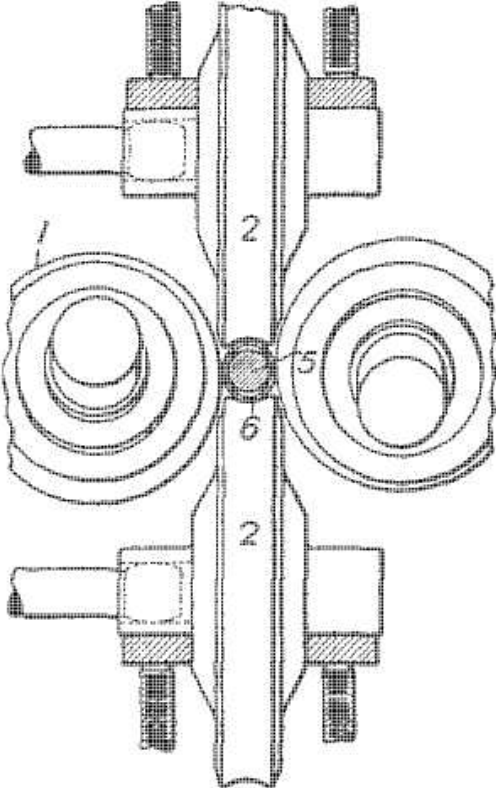
B21B 19/00

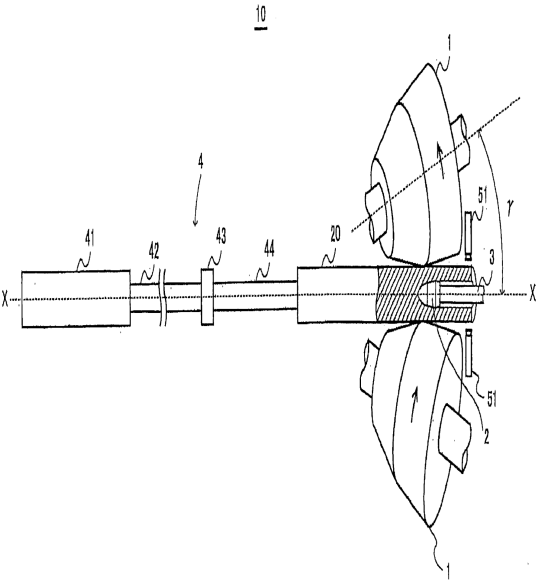
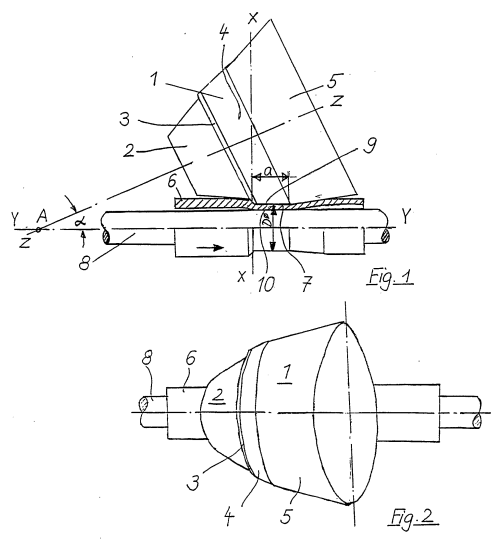
**Tube-rolling by rollers arranged outside the work and having their axes not perpendicular to the axis of the work
(straightening by rollers B21D)**

Definition statement

This subclass/group covers:

This main group covers in particular:

<p>Cross tube rolling (Diescher mills, Stiefel disc piercers, Stiefel rotary piercers)</p>	<p>FIG. I.</p> 
<p>Piercing rolling</p>	

	<p>Fig.1</p>  <p>For solid basic material.</p>
<p>Assel mills</p>	 <p>For hollow basic material.</p>

Informative references

Attention is drawn to the following places, which may be of interest for search:

Making tubes by pilgrim- step rolling

[B21B 21/00](#)

Combined processes for tube rolling, tube rolling not restricted to this group only	B21B 23/00
Mandrels for tube rolling, accessories therefore	B21B 25/00
Making tubes with welded/ soldered seams	B21C 37/08 , B21C 37/09
Control of tube rolling	B21B 37/78

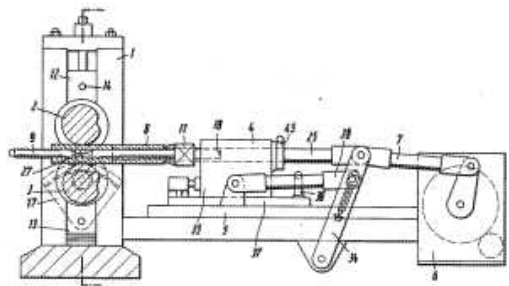
B21B 21/00

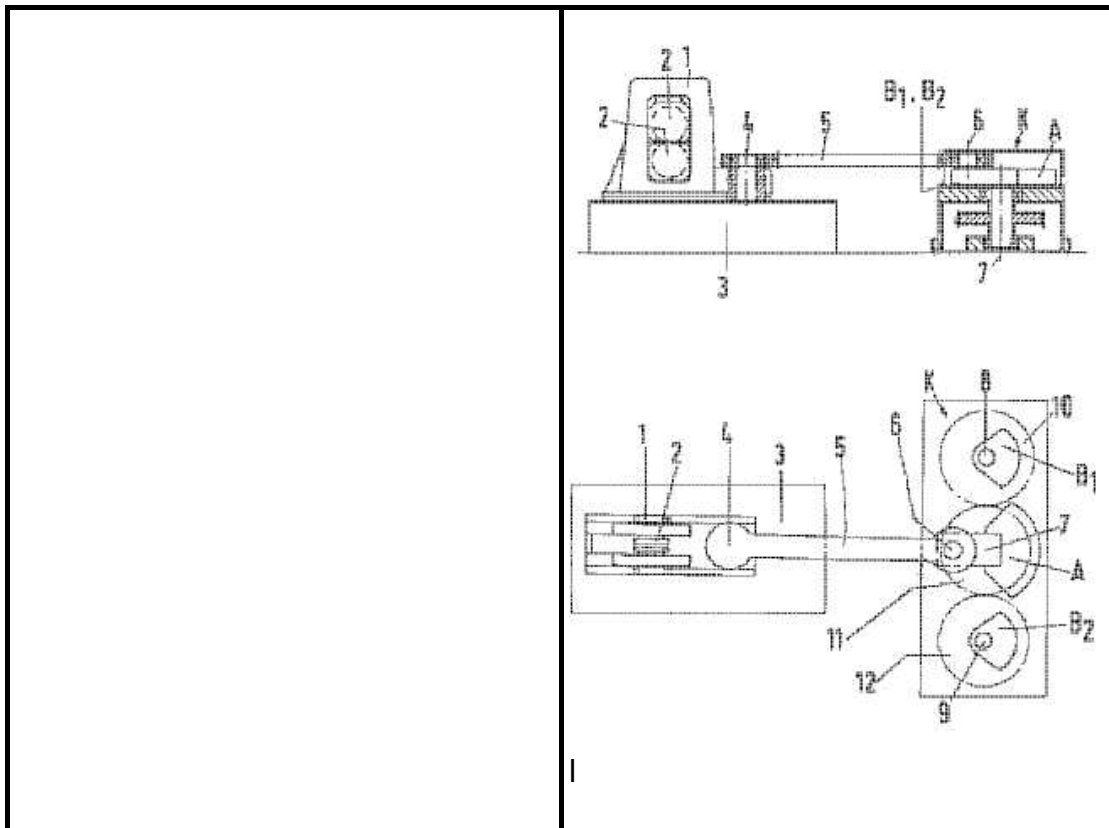
Pilgrim-step tube-rolling, [N: i.e. pilger mills]

Definition statement

This subclass/group covers:

This group covers Pilgrim and pilger rolling mills with reciprocation of tubular work through a stationary roll stand or reciprocation of a rolling stand over a tube:

Pilgrim- step rolling with reciprocating the work	
Pilgrim- step rolling rolling with reciprocating stands	



Informative references

Attention is drawn to the following places, which may be of interest for search:

Combined processes for tube rolling, tube rolling not restricted to this group only	B21B 23/00
Control of tube rolling	B21B 37/78

Synonyms and Keywords

In patent documents the following abbreviations are often used:

Pilgrim- step rolling (mill)	pilger rolling (mill)
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B21B 23/00

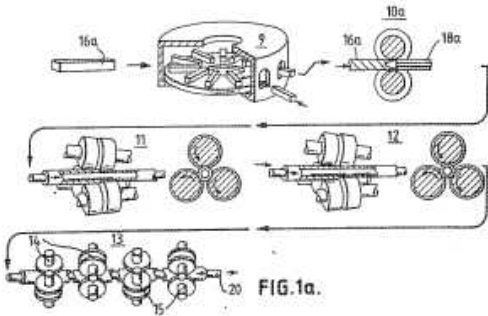
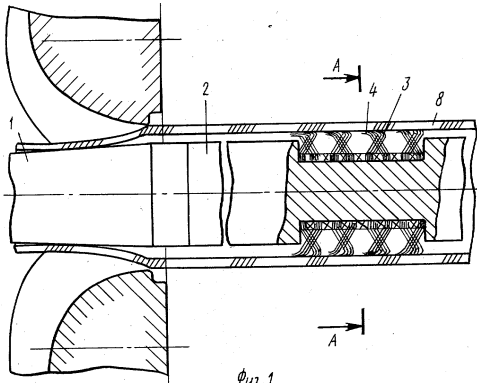
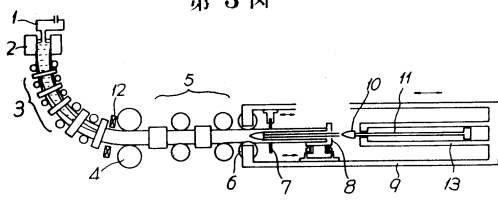
Tube-rolling not restricted to methods provided for in only one of groups B21B17/00, B21B19/00, B21B21/00, e.g.

combined processes [N: planetary tube rolling, auxiliary arrangements, e.g. lubricating, special tube blanks, continuous casting combined with tube rolling] (B21B25/00 takes precedence)

Definition statement

This subclass/group covers:

This main group covers in particular:

<p>Combined tube rolling processes not restricted to methods provided for in only one of groups B21B 17/00, B21B 19/00, B21B 21/00, i.e. if the order or combination of different operations is of importance</p>	
<p>Auxiliary arrangements for tube rolling as e.g. lubricating the tube</p>	 <p>13, 4: greasing brushes. (SU 1072943 A)</p>
<p>Continuous casting combined with tube rolling</p>	 <p>— 34 — (JP 58135708 A)</p>

References relevant to classification in this main group

This subclass/group does not cover:

Tube-rolling by rollers of which the axes are arranged essentially perpendicular to the axis of the work, e.g. "axial" tube-rolling	B21B 17/00
Tube-rolling by rollers arranged outside the work and having their axes not perpendicular to the axis of the work	B21B 19/00
Pilgrim-step tube-rolling, [N: i.e. pilger mills]	B21B 21/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

Making tubes with welded/ soldered seams	B21C 37/08 , B21C 37/09
Mandrels for tube rolling, accessories therefore	B21B 25/00

B21B 25/00

Mandrels for metal tube rolling mills, e.g. mandrels of the types used in the methods covered by group B21B17/00; Accessories or auxiliary means therefore; [N: Construction of, or alloys for, mandrels or plugs]

Definition statement

This subclass/group covers:

This main group covers:

Construction and form of mandrels and plugs for rolling tubes and alloys for manufacturing such mandrels or plugs. Guides, supports or abutments for mandrels. Adjusting devices for mandrels. Cooling or lubricating mandrels during operation. Interchanging mandrels/ mandrel plugs. Cooling during

interchanging mandrels.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Separating tubes from mandrel	B21C 45/00
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B21B 27/00

**Rolls, [N: roll alloys or roll fabrication] (shape of working surfaces required by special processes B21B1/00);
Lubricating, cooling or heating rolls while in use**

Definition statement

This subclass/group covers:

This main group covers:

Shape or construction of rolls for rolling sheets, strips, bars, rods, rounds, tubes wire or the like and alloys for manufacturing such rolls. Sleeved rolls, i.e. rolls with a core and with an outer layer. Rolls with deflectable sleeves. Lubricating, cooling and heating the rolls internally or externally while in use.

References relevant to classification in this main group

This subclass/group does not cover:

Shape of working surfaces required by special processes	B21B 1/00
Flatness/ profile control by cooling, heating or lubricating the rolls	B21B 37/32
Temperature control by heating or cooling the rolls or the product	B21B 37/74

Informative references

Attention is drawn to the following places, which may be of interest for search:

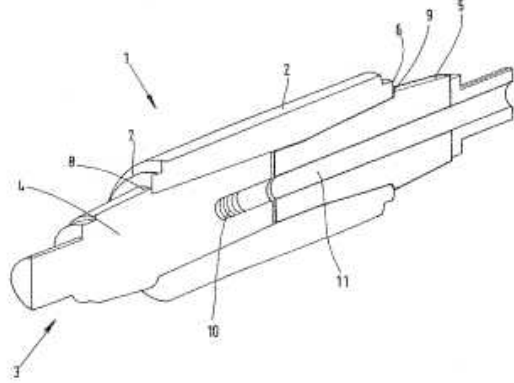
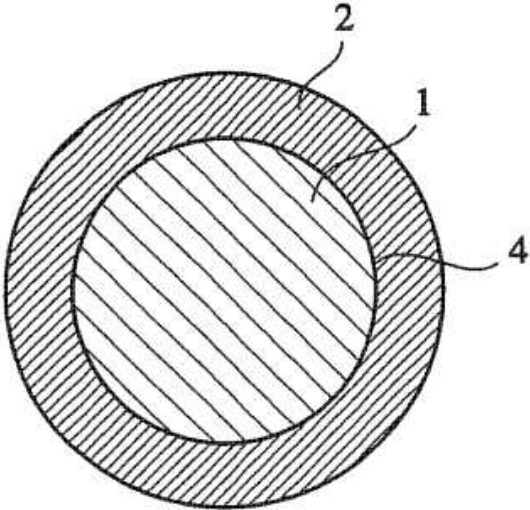
Cooling, heating or lubricating the work	B21B 45/00 , B21B 45/02
Rolling metal of indefinite length in	B21H 8/02

repetitive shapes specially designed for the manufacture of particular objects	
Rolls for paper making machines	D21G 1/00

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

In this main group, the following terms (or expressions) are used with the meaning indicated:

Sleeved rolls	<p>a) Rolls which are assembled of different parts including an outer sleeve:</p>  <p>b) A composite roll comprising an inner layer made e.g. of steel or iron, and an outer layer of e.g. cemented carbide bonded to an outer surface of the inner layer:</p> 
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B21B 28/00

Maintaining rolls or rolling equipment in effective condition (lubricating, cooling or heating rolls while in use B21B27/06)

Definition statement

This subclass/group covers:

Reconditioning of rolls by polishing/ grinding them, outside or inside their stands, while in use.

References relevant to classification in this group

This subclass/group does not cover:

Lubricating, cooling or heating rolls while in use	B21B 27/06
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Machines or devices designed for grinding surfaces of revolution on work	B24B 5/00
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B21B 29/00

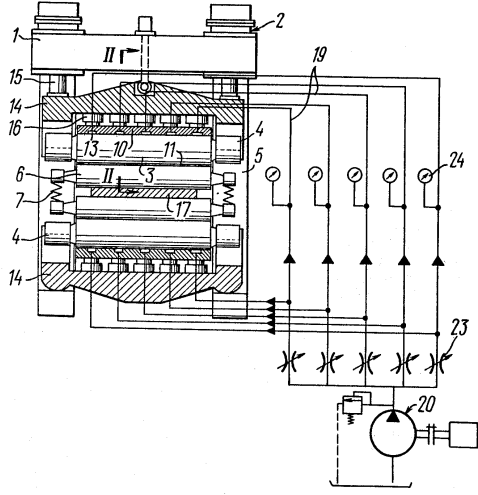
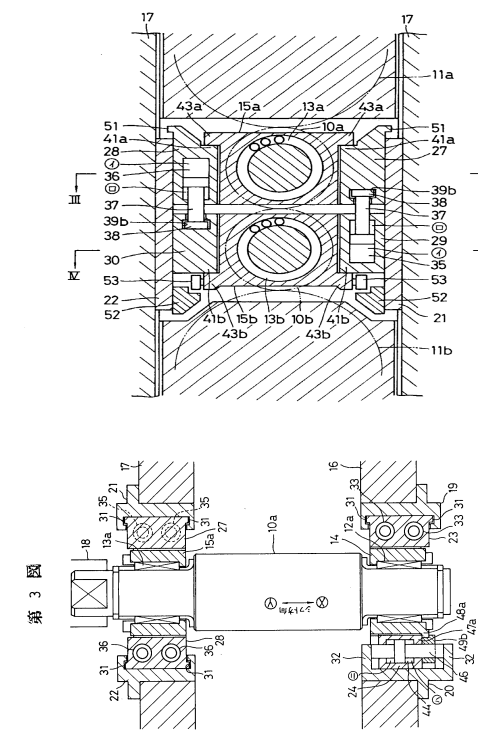
Counter-pressure devices acting on rolls to inhibit deflection of same under load, e.g. backing rolls; [N: Roll bending devices, e.g. hydraulic actuators acting on roll shaft ends (control devices responsive to roll bending B21B37/38)]

Definition statement

This subclass/group covers:

This main group covers backup pressing devices for rollers in a roll stand including intermediate and backup rolls that inhibit deflection, perform roll bending or use hydraulic actuators to act on the rollers or roll shafts:

Backing devices for rolls	
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	 <p>(US4212504 A)</p>
<p>Roll bending devices, e.g. hydraulic actuators acting on roll shaft ends</p>	 <p>(JP1138010 A)</p>

References relevant to classification in this main group

This subclass/group does not cover:

Control of flatness/ profile by roll bending	B21B 37/38
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Informative references

Attention is drawn to the following places, which may be of interest for search:

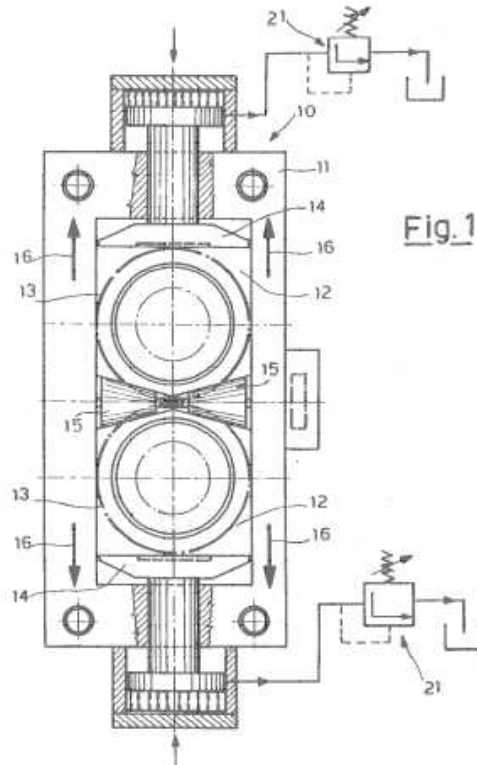
Back- up rolls per se, axially shifting the rolls, lateral support devices	B21B 13/14
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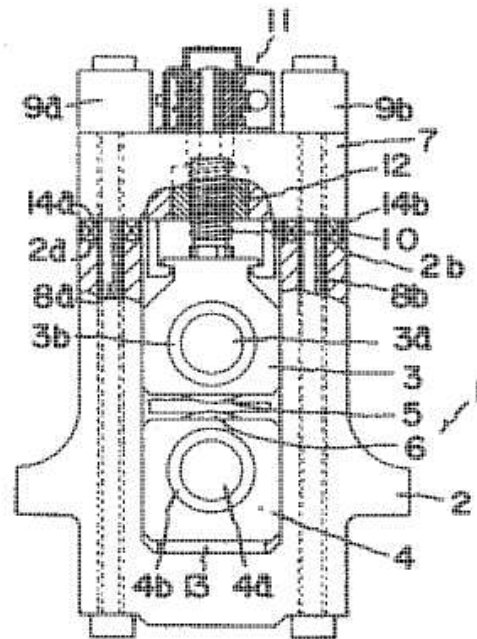
B21B 31/00

Rolling stand structures; Mounting, adjusting, or interchanging rolls, roll mountings, or stand frames

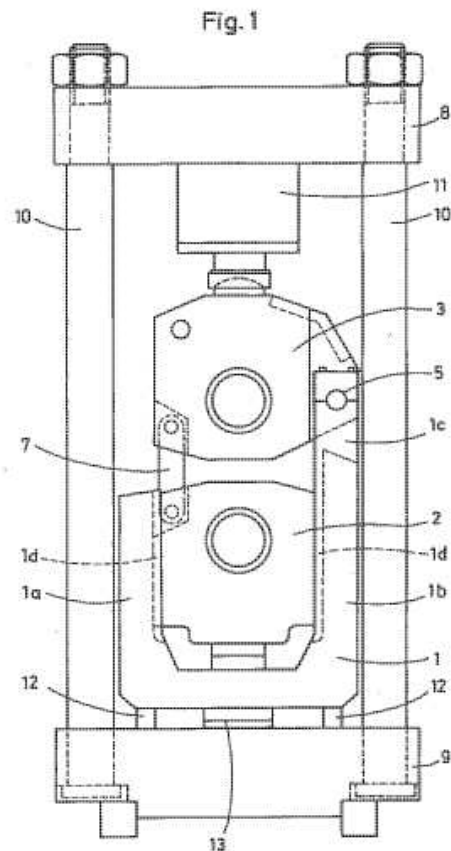
Definition statement

This subclass/group covers:

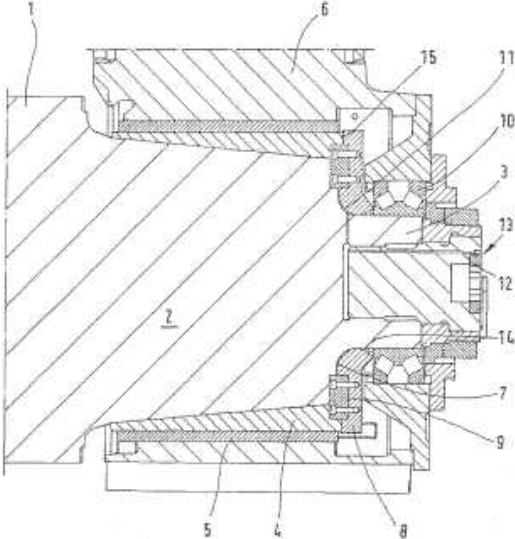
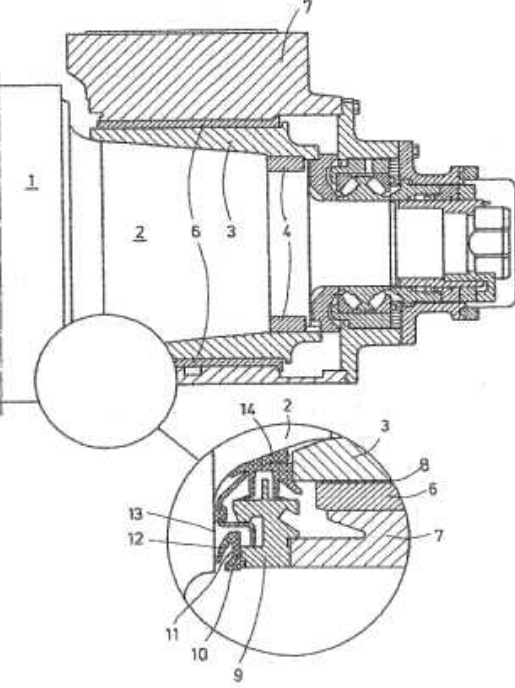
Prestressing of rolls or roll mountings in stands	 <p>Fig. 1</p>
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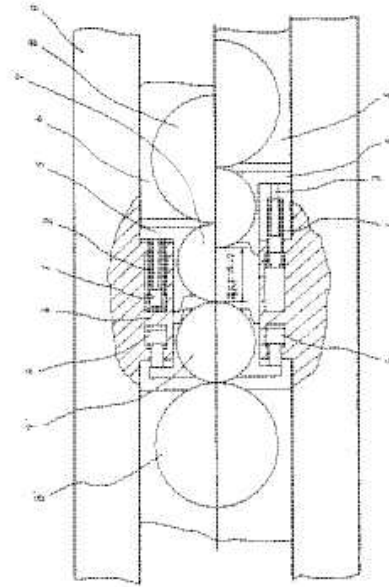


Stands with tie rods in frameless stands, e.g. prestressed tie rods



Morgoil bearings

	 <p>A particular oil film bearing for a tapered roll neck.</p>
<p>Sealing devices</p>	
<p>Balancing rolls</p>	



Carrying the weight of the movable or adjustable rolls, while at the same time allowing the desired movement of the rolls and their bearings in a plane passing through, or substantially through the common axes of the rolls. In case the backing-up and working rolls have their axes disposed in a common plane with their axes all extending parallel one to the other, the direction of adjustment will be exactly in the plane referred to. The purpose of such an adjustment is to enable the size of the pass provided between the working rolls to be varied in accordance with the thickness of the product which it is desired to roll. In particular used in combination with roll bending devices with axially movable rolls.

Toggle-lever mechanism

	<p style="text-align: center;">Fig. 2</p> <p>For moving rolls mechanically perpendicularly to roll axis.</p>
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Bearings in general	F16C
Sealings	F16J
Frames, casings, stands, supports in general	F16M

B21B 33/00

Safety devices not otherwise provided for (safety devices in general F16P); Breaker blocks; Devices for freeing jammed rolls [N: for handling cobbles; Overload safety devices]

Definition statement

This subclass/group covers:

Breaker blocks	<p style="text-align: center;">FIG. 1</p> <p>Used in rolling mills to guard against excessive stresses at the rolls which might occur, for instance with a fixed screw-down arrangement, if there</p>
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	occurred a sudden increase in the thickness of the material being rolled or against a rise in the forces howsoever caused.
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Relatively slidable coverings	B23Q 11/0825
Flexible coverings	B23Q 11/085
Safety devices in general	F16P

B21B 35/00

Drives for metal-rolling mills, [N: e.g. hydraulic drives]

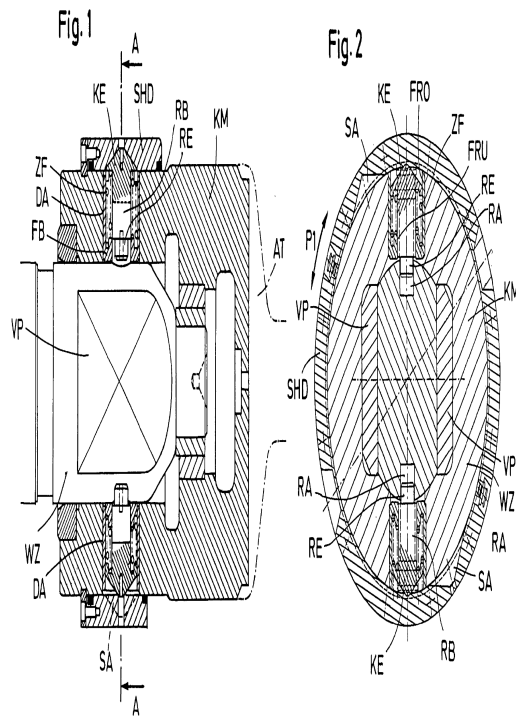
Definition statement

This subclass/group covers:

Drives for metal-rolling mills, e.g. hydraulic drives or electrical drives working continuously or non- continuously, couplings (rigid, yielding), driving spindles or spindle carriers.

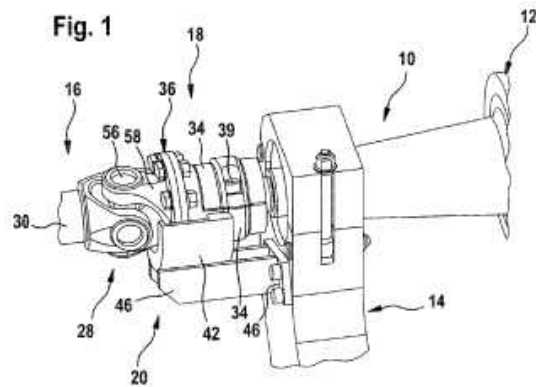
This main group covers in particular:

Coupling boxes placed on roll necks	
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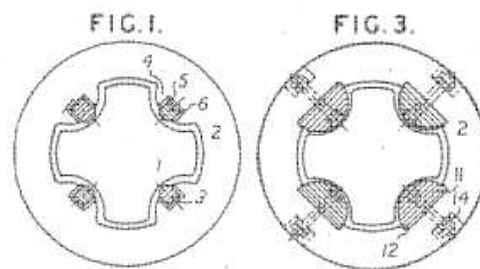
A rigid spindle coupling KM on the shaft neck WZ of a roll.

Universal joints

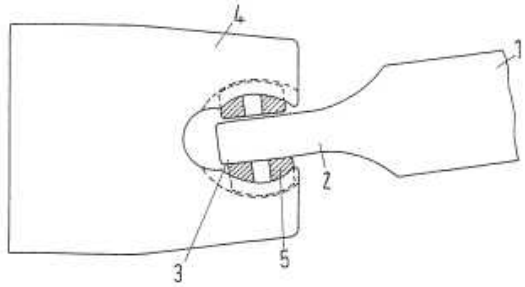


28) Universal joint.

Wobblers couplings



An elastic coupling.

Tongue and slipper joints	 <p>3) Tongue 5) Slipper joint</p>
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Couplings, shafts in general	F16
Rigid couplings in general	F16D 1/00
Yielding couplings in general	F16D 3/00
Hooke's joint in general	F16D 3/26
Tongue and slipper joints in general	F16D 3/265

Synonyms and Keywords

In patent documents the following abbreviations are often used:

Universal joint	universal coupling, U- joint, Cardan joint, Hardy-Spicer joint or Hooke's joint
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B21B 37/00

Control devices or methods specially adapted for metal-rolling mills or the work produced thereby (methods or devices for measuring specially adapted for metal-rolling mills B21B38/00)

Definition statement

This subclass/group covers:

This main group covers:

Control devices or methods specially adapted for metal-rolling mills or the work produced thereby, e.g. control of flatness, profile, tension, roll speed, drive motor, roll gap, roll force, elongation, length, rear end/ front end temperature, cooling, camber or steering control, control of tube rolling.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Methods or devices for measuring specially adapted for metal-rolling mills	B21B 38/00
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Synonyms and Keywords

In patent documents the following abbreviations are often used:

AGC	Automatic Gauge Control
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B21B 38/00

Methods or devices for measuring, [N: detecting or monitoring] specially adapted for metal-rolling mills, e.g. position detection, inspection of the product [N: (Control devices or methods B21B37/00)]

Definition statement

This subclass/group covers:

This main group covers:

Methods or devices for measuring, detecting or monitoring specially adapted for metal-rolling mills, e.g. position detection, inspection of the product, e.g. position detection, inspection of the product, temperature, vibration, chatter (marks), flatness, profile of strips, thickness, width, diameter or other transverse product dimensions, tension/ compression, roll- force, roll- gap (including calibrating or presetting), roll camber.

References relevant to classification in this main group

This subclass/group does not cover:

Measuring/ control of thickness of liquid films for cooling or lubricating	B21B 45/0266
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Control devices or methods specially adapted for metal-rolling mills or the work produced thereby	B21B 37/00
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B21B 39/00

Arrangements for moving, supporting, or positioning work, or controlling its movement, combined with or arranged in, or specially adapted for use in connection with, metal-rolling mills (guiding, conveying, or accumulating easily-flexible work in loops or curves B21B41/00; specially associated with cooling-beds B21B43/00; conveying or transporting in general B65G)

Definition statement

This subclass/group covers:

This main group covers in particular:

Piling, unpling, unscrambling. Transverse moving. Pinch roll sets. Rollers for roller conveyers. Feeding or supporting work. Braking or tensioning arrangements. Guiding, positioning or aligning work. Revolving, turning-over, or like manipulation of work.

References relevant to classification in this main group

This subclass/group does not cover:

Guides in which work is subjected to permanent internal twisting	B21B 15/02
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Guiding, conveying, or accumulating	B21B 41/00
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easily-flexible work in loops or curves	
Guides specially associated with cooling-beds	B21B 43/00
Conveying or transporting in general	B65G

B21B 41/00

Guiding, conveying, or accumulating easily-flexible work, e.g. wire, sheet metal bands, in loops or curves; Loop lifters

Definition statement

This subclass/group covers:

This main group covers:

Returning work to repeat the pass or passes. In which the direction of movement of the work is turned through approximately 180 degrees, e.g. repeaters, i.e. from one stand to another. Without overall change in the general direction of movement of the work, e.g. loop deflectors. Arrangements of interest only with respect to provision for indicating or controlling operations.

References relevant to classification in this main group

This subclass/group does not cover:

Arrangements for moving, supporting, or positioning work, or controlling its movement, combined with or arranged in, or specially adapted for use in connection with, metal-rolling mills	B21B 39/00
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B21B 43/00

Cooling beds, whether stationary or moving; Means specially associated with cooling beds, e.g. for braking work or for transferring it to or from the bed (conveying means in general B65G)

Definition statement

This subclass/group covers:

This main group covers:

Transfer from/ to cooling beds and means as e.g. suitable braking means. Cooling beds comprising racks, walking beams, bars, rolls, worms, carriages, revolving drums, recycling chains or discs or other work- shifting elements to transport the work through the cooling bed. Devices for positioning workpieces "flushed", i.e. with all their axial ends arranged in line on cooling beds or on co-operating conveyers.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Conveying means in general	B65G
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B21B 45/00

Devices for surface [N: or other] treatment of work, specially combined with or arranged in, or specially adapted for use in connection with, metal-rolling mills (B21B15/00, [N: B21B1/227 and B21B27/005] take precedence; technical features of scaling-off devices B21C43/00)

Definition statement

This subclass/group covers:

This main group covers:

Devices for surface or other treatment of work, specially combined with or arranged in, or specially adapted for use in connection with, e.g. cooling the work, coolants, lubricating, cleaning, measuring/ control of thickness of liquid films, removing and recovering of liquids/ lubricants, descaling (hydraulically).

Informative references

Attention is drawn to the following places, which may be of interest for search:

Cleaning travelling work by the use of liquid jets or steam/gas	B08B 3/022
Cleaning work by the use of liquid (cryogenic) gases or supercritical fluids	B08B 7/0021
Arrangements for performing additional metal-working operations specially combined with or arranged	B21B 15/005

in, or specially adapted for use in connection with, metal-rolling mills as e.g. lubricating, cooling or heating	
Lubricating, cooling or heating rolls	B21B 27/06
Technical features of scaling-off devices	B21C 43/00

B21B 47/00

Auxiliary arrangements, devices or methods in connection with rolling of multi-layer sheets of metal (soaking pits C21D9/70)

Definition statement

This subclass/group covers:

Auxiliary arrangements, devices or methods in connection with rolling of multi-layer sheets of metal, e.g. folding sheets before rolling. Separating layers after rolling.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Soaking pits	C21D 9/70
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B21B 99/00

Subject matter not provided for in other groups of this subclass [N0704]

Definition statement

This subclass/group covers:

This main group covers:

Processes and equipment for metal rolling as far as not covered by the main groups [B21B 1/00](#) to [B21B 47/00](#).